

University
of Idaho

SHOCK THE NATION

Engineering Release Review

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ROACH**

VALUE PROPOSITION

Provide an alternate safety device for preventing access to a room or house via the door handle, using a tesla coil design. This design should electrically shock intruders with the a high voltage, low current, with the intent to hurt intruders but not injure. This shock is a directed electrical arch out of the handle.

PRODUCT REQUIREMENTS

Electrical

- Ability to arm and disarm security system
- Warning system (LEDs)
- Produce an electrical shock to intruders from the handle of a door
- Sense an approaching intruder

Mechanical

- Use probe attached to hand model for testing/demonstration
- A closed environment for display/demonstration
- Retrofitted door/door handle

Cost

- Maximum cost to build proof-of-concept prototype
 - \$1000

PRELIMINARY PROOF OF CONCEPT

- Calculations (See Circuit Design Documentation)
- Simulations (See Laptop)
- Shop Drawings (See Mechanical Documentation)

PROJECT MANAGEMENT

Budget

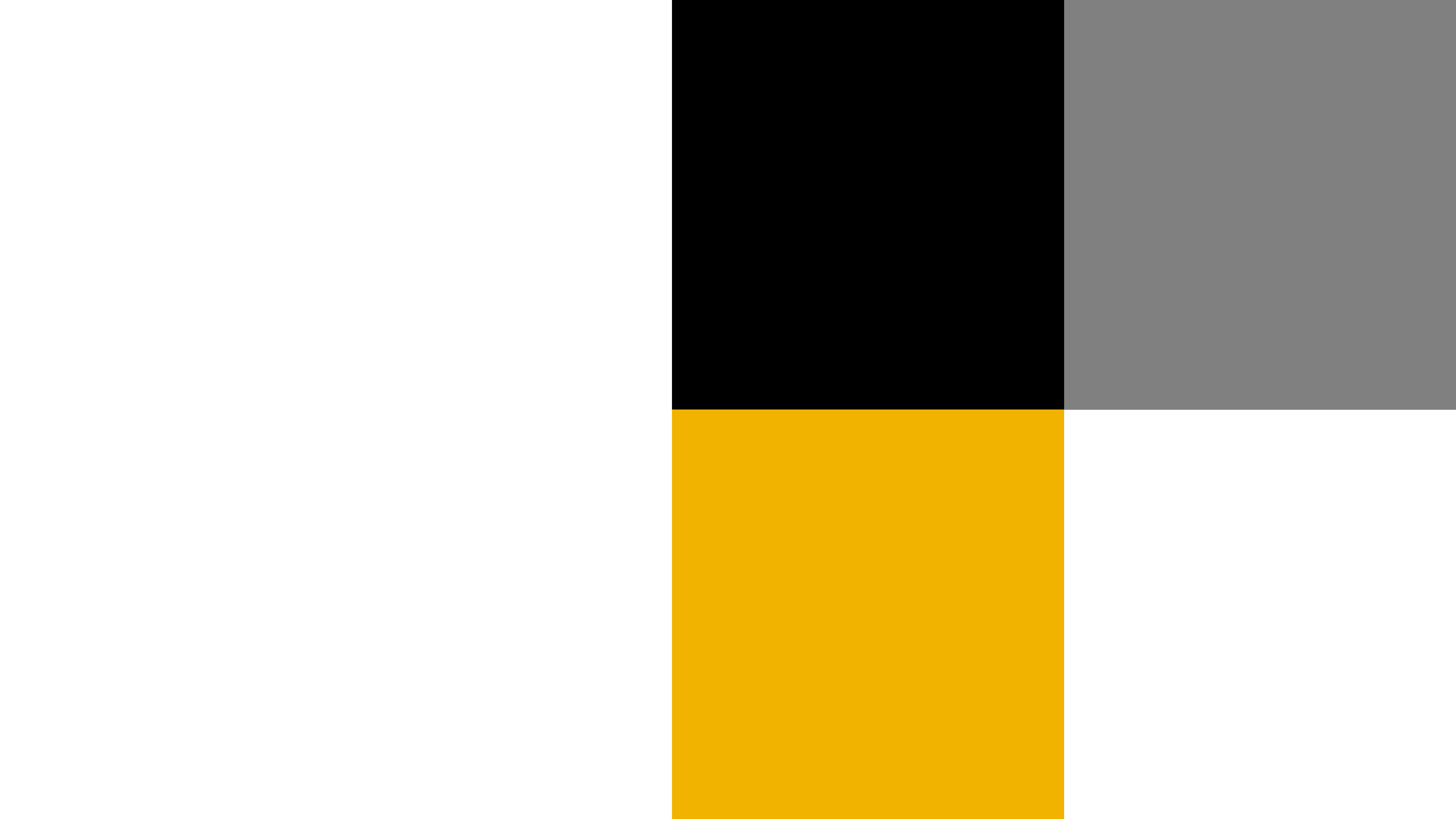
Expense Items	Predicted Cost	Actual Cost
Sensor(s)	\$10.00	\$4.95
Wire(s)	\$30.00	
Microprocessor	\$50.00	\$121.41
Magnet Wire	\$35.00	
Power supply components	\$50.00	\$114.90
ME misc supplies	\$75.00	
Motor	\$15.00	
Robotic Arm	\$20.00	
Misc EE components	\$10.00	
Plastic Tubing	\$12.00	
Metal Bar	\$125.00	
Door and frame	\$100.00	\$50.00
Insulation	\$60.00	\$0.00
Led lights	\$20.00	
Insulated gloves	\$100.00	
Safety equipment	\$100.00	
Total:	\$812.00	\$291.26
Budget:	\$1,000	

Parts Ordered	Total Price	Received Parts
Ultrasonic sensor	\$4.95	<input checked="" type="checkbox"/>
solid state relay switch	\$26.41	<input checked="" type="checkbox"/>
power magnetic switch	\$13.99	<input checked="" type="checkbox"/>
PI screen	\$64.00	<input checked="" type="checkbox"/>
PI case	\$14.91	<input checked="" type="checkbox"/>
PI 3	\$42.50	<input checked="" type="checkbox"/>
Mistake order return	\$14.12	<input checked="" type="checkbox"/>
Door	\$50.00	<input checked="" type="checkbox"/>
transformer	\$60.38	<input type="checkbox"/>

Spent	\$291.26
Mechanical Projected Cost	\$284.14
Electrical Projected Cost	\$166.12
Total	\$859.54

Testing

- Mock hand attached to motor
- Tesla Coil inside plexiglass box container
- Extend hand to distance of approximately 5 inches from door handle
- If no arc appears, shut down tesla coil and move hand closer until desired result



RISK MANAGEMENT

Safety is #1 concern...

- Use motor to extend arm
- Place Tesla coil in non-conductive box
- Low current
- Testing prior to implementation